

Protozoan Diversity in Gawrala and Vinjasan Lake of Bhadrawati, District Chandrapur (M.S.), India

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Abstract

Protozoa are single celled animals found in most habitats. Most species are free living, but all higher animals are infected with one or more species of protozoa. Diversity of Protozoa in the Gawrala and Vinjasan Lake of Bhadrawati was studied from October 2013 to September 2015. A total of 41 species of protozoan were identified in both lakes

KEYWORDS Zooplankton, Protozoa, Gawrala and Vinjasan lake.

INTRODUCTION

The zooplankton are resident fauna of aquatic ecosystems which respond to a wide range of water quality changes and have a very feeble locomotive power. The zooplankton serve as an important link in the aquatic food chain (Sharma, 1998). Zooplankton, small animals that swim about in open water, are primary consumers. They graze on algae, bacteria, and detritus (partially decayed organic material). Some species can be seen with the naked eye, although they are more easily observed with a hand lens or low-power microscopes. Planktonic protozoans are group of unicellular ciliated or flagellated organisms. They feed on either picoplankton or nanoflagellates and small nanophytoplanktons according to their size. Heterotrophic nanoflagellates are more abundant than ciliates in freshwater body. Heterotrophic nanoflagellates are more abundant than ciliates in freshwater body. Most of the protozoans are usually not sampled due to their minute size.

The Gawrala and Vinjasan lakes are fresh water bodies located within Bhadrawati town in Chandrapur district of Maharashtra state. Bhadrawati is a tahsil place near about 25 Km North of Chandrapur and 125 Km South East from Nagpur. It is situated at about 211m above the mean sea level and is at 20°06'35.67" N latitude and 79°07'7.33" E longitude.

MATERIAL AND METHODS

Sample for planktonic study were collected monthly from each pond. The samples were collected in the morning hours between 8.30a.m to 10.30 a.m. 50 Lt. of water sample was filtrated through the plankton net made of bolting silk number 25 with mesh size 64 lime. The collected samples were allowed to settle down by adding Lugol's iodine. Normally, sedimentation requires 24 hrs. After which supernatant was removed and concentrate was made up to 50 ml depending the number of plankton and preserved in 5% formalin for further studies.

For the quantitative study, the concentrated sample was shaken and immediately one drop of sample was taken on a clear micro side with the help of a

standard dropper, the whole drop was then carefully covered with the cover glass and observed. Plankton identification up to genera and whenever possible up to species level was classified according to keys given by Prescott (1954), Edmonson (1959), Sehgal (1983), Adoni (1985) and APHA (1985) and standard analysis was undertaken as per Zar (2005).

Quantitative study of plankton was done by Sedgwick – Rafter cell method.

Sedgwick–Rafter Cell method

The Sedgwick Rafter Cell is a special kind of slide similar to the Haemocytometer. The cell has a 50 mm × 20 mm × 10 mm rectangular cavity that holds 1 ml sample. The cell is moved in horizontal directions on the stage of an inverted microscope and planktonic species encountered in the field are enumerated. A number of replicate samples are enumerated to calculate plankton per lit.

Planktons (Units/lit.) = $\frac{n \times c}{v}$

Where, n = number of plankton in 1 ml.

c = volume of concentrate.

v = volume of sample in lit.

RESULT AND DISCUSSION

In the present research work, Protozoa is represented by 41 species at all the sampling sites. Protozoa species shows variations as per sampling sites. In Gawrala lake, 41 species of protozoa is recorded in all respective sites A, B and C. In Vinjasan lake only in site A, 33 species were recorded in 2013-2014 and in 2014-2015, 41 species were recorded. In B and C 41 species were recorded in both year.

Kedar (2002) found 34 species of Protozoas in Rishi lake, Karanja (Lad) of Maharashtra. Kamble and Meshram (2005) observe only two species of Protozoa in Khatijapur tank, Achalpur, Maharashtra. Sharma *et.al.*, (2007) found four species in Pichhola lake, Jaipur, Rajasthan. Patil *et.al.*, (2008) observe 10 species of Protozoa in Rishi lake and two species in Yedshi lake in Washim district of Maharashtra. Sharma K.K, Sarbajeet Kour and Neha Antal (2015) reported 2 species in two perrinial ponds in Jammu region.

In present investigation, among different species of protozoa in Gawrala lake in siteA *Diffugia lobostoma* is dominant followed by *Actinophryl sol.*, *Amphileptus claparedei*, *Campanella umbellaria*, *Amoeba proteus*, *Lionotus fasciola*, *Difflugia alveoata* and *Centropyxis arcelloides* in 2013-2014. In 2014-2015, *Actinophryl sol.* is dominant followed by *Holophrya simplex*, *Actinosphaerium eichhornii*, *Amphileptus claparedei* and *Centropyxis arcelloides*. In site B, *Actinophryl sol.* is dominant followed by *Amoeba proteus* and *Amphileptus claparedei* in 2013-2014. In 2014-2015 *Campanella umbellaria* is dominant followed by *Pseudoblepharisma crassum* and *Diffugia lobostoma*. In site C, *Amphileptus claparedei* is dominant followed by *Amoeba proteus* and *Campanella umbellaria* in 2013-2014. In 2014-2015 *Centropyxis hemisphaerica* is dominant followed by *Difflugia lebes* and *Paramecium caudatum*.

In Vinjasan lake, in site A, *Actinophryl sol.* is dominant followed by *Actinosphaerium eichhornii* and *Holophrya simplex* in 2013-2014. In 2014-2015,

Diffugia lobostoma is dominant followed by *Actinophryl sol.*, *Amphileptus claparedei*. In site B, *Amoeba proteus* is dominant followed by *Bryometopus sphagni* and *Diffugia lobostoma* in 2013-2014. In 2014-2015, *Actinophryl sol.* is dominant followed by *Amoeba proteus* and *Amphileptus claparedei*. In site C, *Actinophryl sol.* is dominant followed by *Amphileptus claparedei* in both years.

Ade (2001) and Kedar (2002) observe *Spasmosstoma viridae*, *Astramoeba radiosa* and *Paramecium aurelis* as a dominant species throughout the year in water bodies of Vidarbha. Patil *et.al.*, (2008) found *Amoeba sp.*, *Bursaria sp.*, *Diffugia sp.*, *Paramecium sp.* and *Vorticella sp.* as a dominant Protozoa in Rishi lake and *Paramecium sp.* and *Verticella sp.* in Yedshi lake of Washim district of Maharashtra. Kadam *et.al.*, (2014) reported *Arcella discoidea*, *Diffugia lebes*, *Centropyxis aculeate* and *Wailesella eboracensis* is the dominant species in Pillowa Reservoir, District Morena, Madhya Pradesh, India.

According to Porter *et.al.*, (1979) protozoans play a key role in zooplankton community by representing an important trophic link while Pace and Orcutt (1981) suggests that protozoans play an important role in nutrient regeneration because of their high rates of phosphorous excretion

In present investigation the maximum seasonal value was recorded in monsoon season and minimum recorded in winter season. Maruthanayagam *et.al.*, (2003) studied the season specific zooplankton diversity in Thirukkulam pond, Mayiladuthurai, Tamilnadu, India, his study showed that community size of zooplankton was the highest in rainy season while the lowest density of zooplankton was in summer due to the higher temperature.

Anant J. Dhembare (2011) observe the seasonal density of protozoa in rainy (2.99 %), winter (2.4 %) and summer (2.8 %) and state that the occurrence of these organisms depends upon organic matter and water chemistry in in Mula Dam, Rahuri, Maharashtra.

CONCLUSION

Seasonally, Protozoan diversity was maximum during the monsoon season and minimum during the winter season, indicating a positive relation with transparency, conductivity and dissolved oxygen.

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Table: 1

Two yearly variation of Zooplankton from sites of Gawrala Lake during year 2013-15

S. N.	Parameters	A	B	C	Total
1	Protozoa	27.2 1 ± 8.30	26.0 4 ± 3.89	26.3 8 ± 4.99	26.5 4 ± 1.8 8

Table: 2

Two yearly variation of Zooplankton from sites of Vinjasan Lake during year 2013-15

S.N	Paramete rs	A	B	C	Total
1	Protozoa	24.8 8 ± 6.6 8	26.1 3 ± 5.9 8	28.3 3 ± 3.8 4	26.4 4 ± 1.2 1